

Application No.: 10/759,497

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**REMARKS**

Favorable reconsideration of the application in view the amended claims and the following remarks is respectfully requested. Claims 1 to 18 are pending. Claims 1, 15 and 18 are amended. Claim 8 is also amended to correct an obvious typographical error.

Applicants gratefully acknowledge the withdrawal of the specification objections (a)-(f) in light of the amendments submitted in the Applicant's response to the previous Office Action. Applicants further acknowledge the revision of the 102(b)/103(a) rejection over Paglia (U.S. 6,506,460) into a 103(a) rejection over Paglia in view of Araki (6,706,819 B1). Furthermore, pursuant to the Patent Office observation at ¶ 9 of the Final Office Action, and Applicants' remarks at page 10, lines 10-11 of the response to the previous office action, claim 18 has been amended to include a peroxide curable component.

Claims 1, 15 and 18 are amended to require a peroxide. Support for this amendment can be found in the original specification, for instance, at page 4, line 27 to page 5, line 4.

**Claim Rejections under 35 U.S.C. § 103****1. Brinati et al. in view of Araki et al.**

Claims 1-18 were rejected under 35 USC § 103(a) as being unpatentable over Brinati et al. (U.S. Patent No. 5,175,223) in view of Araki et al. (U.S. Patent No. 6,706,819 B1).

The Patent Office admits that Brinati uses only a phosphorous-containing cure accelerator when the non-cure-site-containing fluorinated blend is subject to routine vulcanization with conventional fillers in order to make articles. The Patent Office further admits that Brinati is silent about adding a cure site monomer in the course of copolymerization so as to be curable by peroxide.

To overcome this deficiency, the Patent Office asserts that Araki teaches a diiodine compound and other cure-site monomers containing nitrile, bromine and iodine. The Patent Office asserts that these cure sites can be incorporated in the copolymerization of fluorinated copolymers and cured with peroxide.

The Patent Office concludes by asserting that the articles produced by all the references contain fluorinated copolymers having similar monomers, and therefore one of ordinary skill in

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the art would find it obvious to modify Brinati by adding the cure site monomers suitable for peroxide crosslinking taught by Araki.

2. Paglia et al. in view of Araki et al.

Claims 1–18 were rejected under 35 U.S.C. 103(a) as being unpatentable over Paglia et al. (U.S. Patent No. 6,506,460) in view of Araki et al. (U.S. Patent No. 6,706,819 B1).

The Patent Office admits that Paglia's disclosure discusses only a UV curing system and that other systems such as hemolytic or heterolytic heat-induced decomposition of peroxide compounds may cause some trouble in the systems of Paglia.

The Patent Office alleges, however, that Paglia is only restricted to using a UV curing system at a lower temperature when a rapid crosslinking reaction is desired. The Patent Office alleges that Paglia describes various cure site monomers that include bromine, iodine, and chlorine. The Patent Office further alleges that Araki describes a diiodinated cure site monomer and other cure site monomers including nitrile, bromine, and iodine containing cure site monomers. Furthermore, the Patent Office asserts that Araki indicates that better mechanical properties are obtained with peroxide curing.

The Patent Office concludes by asserting that the copolymers produced by Paglia and Araki are similar and use similar cure site monomers and that because of this similarity, one of ordinary skill in the art would have found it obvious to modify Paglia's copolymerization process by adding or exchanging the cure-site monomer(s) suitable for peroxide crosslinking taught by Araki.

Applicants' Response to the Rejections under 35 U.S.C. § 103

Applicants aver that the amended Claims 1-18 are patentable over Paglia and Brinati each individually in view of Araki. As noted above, independent claims 1, 15 and 18 have been amended to indicate that the compound includes a peroxide.

The present claims are directed to a compound suitable for forming fluoroelastomers having the unique features of a low temperature properties and desirable physical properties. The compound includes an elastomeric copolymer having interpolymerized units derived from vinylidene fluoride (VDF), at least one cure site moiety, and substantially no perfluorinated vinyl

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ether monomers. The compound also includes a peroxide curable component and at least one mineral filler. Furthermore, the compound includes a peroxide. Upon vulcanization the resulting compound has desirable physical characteristics as indicated by the tensile strength, the elongation, and the temperature to 10% retraction at lower temperature (TR 10).

1. Brinati et al. in view of Araki et al.

Applicants aver that amended Claims 1-18 are patentable over Brinati in view of Araki. Brinati discloses terpolymer fluoroelastomers of vinylidene fluoride, hexafluoropropene and tetrafluoroethylene, wherein the polymers have repeating units derived from specific weight percent compositions of each monomer.

Brinati provides only for a bisphenol-onium cure system, as admitted by the Patent Office. See page 3, lines 33-45. The Patent Office has not shown where Brinati teaches, suggests or describes using a peroxide compound for curing. Indeed, the polymers of Brinati do not contain any cure site monomer, also as admitted by the Patent Office. Thus, the polymers of Brinati are not capable of peroxide curing.

The Patent Office has not shown where Araki teaches, suggests or describes how to improve low temperature properties such as TR10, as demonstrated by the compounds of the present application. Araki neither teaches, suggests or describes an elastomeric copolymer having interpolymerized monomeric units derived from vinylidene fluoride monomer (it shows only TFE/PMVE copolymers, TFE/PPVE copolymers, PFA, and FEP). Araki also fails to teach, suggest or describe elastomeric copolymers having substantially no perfluorinated vinyl ether monomers (all of the described elastomeric polymers contain PMVE, PPVE, or some other perfluorinated vinyl ether monomer). With Araki failing to teach the elastomeric copolymers of the present invention, the Patent Office has failed to establish a motivation present in the teachings of the prior art for modifying the disclosure of Brinati to selectively incorporate only the cure site monomers of Araki and to otherwise ignore the other teachings of Araki, including the use of perfluorinated vinyl ether monomers in its elastomeric copolymer systems.

"The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the modification." See MPEP § 2143.01 (citing *In re Mills*, 916 F.2d 680, 16 USPQ 1430 (Fed Cir. 1990)).

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The Patent Office combination of Brinati with Araki is inappropriate. First, the Patent Office inappropriately equates a reporting of improved properties in Araki with a motivation to combine references. Araki itself does not teach, suggest or describe modifying the polymers described therein to provide the polymers described in Brinati (actually, it is not even the polymers described in Brinati, but the polymers described in Brinati further modified to provide incorporation peroxide curable cure site monomers that Araki must suggest to make out a prima facie case of obviousness). Instead, the Patent Office relies on its own assertion that because the description in Araki reports improved properties, one would be motivated to modify Araki as provided in Brinati. The mere report of improved properties in Araki, however, cannot provide motivation to modify the fluoropolymer described therein so as to provide any possible fluoropolymer.

Furthermore, Araki discusses incorporation of cure site monomers in the context of preparing a polymer blend of a multi-segment fluoropolymer and a fluorine-containing resin having a crystalline melting point or glass transition temperature of less than 150°C. See Araki, Claim 1. Such a polymer blend is incapable of meeting the limitation of amended Claims 1 and 15. Therefore, a pure combination of Araki with Brinati would fail to produce the claimed compound. To overcome this, the Patent Office selectively chooses which aspects of Araki to combine with Brinati. The Patent Office fails to account, however, for how Araki would suggest to one of ordinary skill in the art that it is desirable to ignore the teachings of the particular polymer blend described therein and select only the aspect of Araki directed to cure site monomers, and then to combine only this limited aspect with the description in Brinati.

Second, the Patent Office has not shown where Brinati itself provides motivation to modify its teachings to provide a peroxide curable fluoropolymer, a peroxide, and mineral fillers as opposed to the peroxide non-curable fluoropolymers, the bisphenol-onium cure system and carbon black fillers described therein. The Patent Office asserts that desirable physical properties may be expected when combining the cure site monomers of Araki with the polymers of Brinati. But in order to arrive at the present claims, the Patent Office must show more than an expectation of desirable physical properties. The Patent Office must show motivation in Brinati to modify its polymer as described in claim 1 of the present application, to modify its cure system as described in claim 1 of the present application, to modify its fillers as described in claim 1 of the present

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application, to select only that aspect of Araki directed toward peroxide curable cure site monomers, and to disregard the teachings of Araki directed toward the polymer blends and perfluoro vinyl ether containing monomers described therein. The Patent Office has made no such showing. The Patent Office has gone far beyond the descriptions of the prior art to provide motivation for this combination.

The Patent Office has not shown where motivation exists in the prior art to selectively modify Brinati in view of particular provisions in Araki, while ignoring other provisions of Araki. When the Patent Office fails to show where the prior art itself provides a motivation to combine or modify references to give the present claims, it fails to establish a prima facie case of obviousness.

Even if the Patent Office could present a prima facie case of obviousness, obviousness may be rebutted by evidence "that the claimed invention yields unexpectedly improved properties or properties not present in the prior art. Rebuttal evidence may consist of a showing that the claimed compound possesses unexpected properties. A showing of unexpected results must be based on evidence, not argument or speculation." See MPEP § 2144.08 (citations omitted).

Brinati discusses low temperature properties by referencing the glass transition temperature of the polymers described (T<sub>g</sub>) and the temperature retraction test (TR10). When Example 3 of Brinati is compared with Example 4 of the present application, the T<sub>g</sub> and the calculated monomer weight and mole ratios are similar. See Comparison Table provided below. Despite some compositional similarity of the fluoropolymers, however, the TR10 of the two compounds are significantly different. These surprising and substantial improvements are observed when comparing Example 3 from Brinati which uses a bisphenol-onium cure system and carbon black filler with the present claims which are directed to a combination of a peroxide cure and a mineral filler.

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**Comparison Table**

	<u>Example 3 in Brinati</u>	<u>Example 4 in the Present Application</u>
<u>Polymer Components</u> <u>wt% (mol %)</u>		
Vinylidene Fluoride	59.5 (75.0)	60.6 (75.3)
Hexafluoropropylene	28.6 (15.4)	27.0 (14.3)
Tetrafluoroethylene	11.9 (9.6)	12.4 (9.9)
<u>Temperature Properties</u>		
Tg (°C)	- 25.4	-24
TR10 (°C)	-18	-24

In this case, the Applicants have rebutted the Patent Office assertion of obviousness. Applicants have shown that the claimed compounds possess both unexpectedly improved properties and properties not present in the prior art. Applicants have shown, in direct comparison of data, the unexpected benefits of the present claims over the prior art. This showing is based on the evidence provided in the comparison between the present application and the descriptions provided in the prior art.

The Applicants respectfully submit maintenance of the rejection of amended claims 1–18 under 35 USC 103(a) based on Brinati in view of Araki is inappropriate. Accordingly, Applicants request that this rejection be withdrawn.

2. Paglia et al. in view of Araki et al.

Applicants aver that amended Claims 1-18 are patentable over Paglia et al. in view of Araki et al.

As the Patent Office admits, Paglia describes only a UV curing system at room temperature. The Patent Office attempts to circumvent this specific teaching of Paglia by asserting that Paglia is only directed toward UV curing at lower temperature when a rapid crosslinking reaction is desired.

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According to the Patent Office, however, one may ignore this explicit teaching of Paglia if one wishes to provide a crosslinking reaction that is not rapid.

The Patent Office has not shown where Paglia itself teaches, suggests or describes a motivation to modify its disclosure to provide for anything but a rapid crosslinking reaction under UV curing. It is unclear wherefrom the Patent Office finds such motivation.

Instead of citing specific motivation to modify Paglia, the Patent Office asserts that because Araki describes copolymers having good mechanical properties where a peroxide curable system and a peroxide cure is used, one of ordinary skill in the art would be motivated to combine the description in Araki with that of Paglia.

The Patent Office combination is inappropriate. Again, the Patent Office inappropriately equates a reporting of improved properties in Araki with a motivation to combine references. Araki itself does not teach, suggest or describe modifying the polymers described therein to provide the polymers described in Paglia. In fact, Araki describes polymer blends, as discussed above. These polymer blends are structurally distinct from the present invention. As noted in the previous response to the Office Action dated January 6, 2005, (paper No. 5), the polymer blends of Araki cannot possibly provide the physical properties of the compounds described in amended claims 1 and 15. Nonetheless, the Patent Office relies on an assertion that because the description in Araki reports improved properties, one would be motivated to selectively modify Araki, keeping the cure site monomers and the peroxide cure, ignoring the fluoropolymer blend described therein, and apply these selected teachings to the fluoropolymer described in Paglia. The Patent Office has not shown where Araki itself provides this motivation of selective modification.

Second, the Patent Office parses the teachings of Paglia by asserting that the explicit teaching to use only a UV curing system relates to systems wherein rapid curing is desired. In contrast, where rapid curing is not desired, the Patent Office asserts that one may modify the curing system to provide for a peroxide cure. This distinction is not part of Paglia's description. The Patent Office has not shown where Paglia itself teaches, suggests or describes a desire to obtain a curing system that cures less rapidly, let alone one that cures using a peroxide cure. Again, the mere fact that references can be modified does not render the resultant modification obvious unless the prior art also suggests the desirability of the modification. See MPEP §

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2143.01 (citing *In re Mills*, 916 F.2d 680, 16 USPQ 1430 (Fed Cir. 1990)). In this instance, it is the Patent Office, not the prior art, that is suggesting the desirability of the modification. This is an inappropriate source of motivation to combine or modify references.

The Applicants respectfully submit maintenance of the rejection of amended claims 1-18 under 35 USC 103(a) based on Paglia in view of Araki is inappropriate. Accordingly, Applicants request that this rejection be withdrawn.



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**CONCLUSION**

In view of the foregoing remarks, favorable reconsideration of the present application and the passing of this case to issue with all claims allowed are courteously solicited.

Should the Examiner wish to discuss any aspect of this application, applicants' attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,

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Date

By: 

Brian E. Szymanski, Reg. No.: 39,523

Telephone No.: (651) 737-9138

Office of Intellectual Property Counsel  
3M Innovative Properties Company  
Facsimile No.: 651-736-3833